

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

Claims 1 – 6 (cancelled)

7. (Currently Amended) A bearing apparatus for a wheel of a vehicle comprising:

an inner member including a wheel hub having an integrally formed wheel mounting flange at one end and a cylindrical portion axially extending from the wheel mounting flange[[,]];

fitting an inner ring ~~fitted~~ ~~[[on]]~~ onto the cylindrical portion, the inner ring including an end surface substantially perpendicular to an axis of the bearing apparatus and an outer circumferential surface;

arranging an outer member ~~arranged~~ around the inner member;

containing double row rolling elements freely rollably ~~contained~~ between the inner and outer members;

securing the inner ring ~~being secured~~ in an axial direction relative to the wheel hub; ~~by a~~

outwardly deforming a caulked portion at the end of the cylindrical portion of the wheel hub to abut against the end surface of the inner ring, ~~said caulked portion formed by radially outwardly deforming the end of the cylindrical portion of the wheel hub;~~ and

cutting a chamfered surface on a radially outermost positioned between the end surface and the outer circumferential surface of a back side of the inner ring;

recutting the chamfered surface after heat treatment so that is recut
~~providing the chamfered surface to reduce~~ reduces stress concentrations due to gouges on the chamfered surface and ~~to prevent~~ prevents the generation of cracks from the starting point of the gouge.

8. (Previously Presented) The bearing apparatus for a wheel of a vehicle according to claim 7 wherein the wheel hub is formed with an inner raceway surface on its outer circumferential surface and a wheel hub outer circumferential region from a base of the wheel mounting flange to the cylindrical portion through the inner raceway surface is hardened by high frequency induction hardening to have a surface hardness of 54~64 HRC, said caulked portion remains as a non-quenched portion having a surface hardness less than 24 HRC after forging, and hoop stress generated within the inner ring by plastic deformation of the end of the cylindrical portion is limited to less than 300 MPa.

9. (Withdrawn) A method for manufacturing a bearing apparatus for a wheel of a vehicle comprising:

providing an inner member including a wheel hub having an integrally formed wheel mounting flange at one end and a cylindrical portion axially extending from the wheel mounting flange, an inner ring fitted on the cylindrical portion; an outer

member arranged around the inner member, and double row rolling elements freely rollably contained between the inner and outer members;

securing the inner ring in an axial direction relative to the wheel hub;

radially outwardly deforming the end of the cylindrical portion of the wheel hub forming a caulked portion;

recutting a chamfered outer circumferential surface of a back side of the inner ring after heat treatment of said inner ring.

10. (Withdrawn) The method for manufacturing a bearing apparatus for a wheel of a vehicle according to claim 9 wherein said recutting of the chamfered outer circumferential surface of the back side of the inner ring is re-cut by a hardened steel cutting tool after said heat treatment.

11. (Withdrawn) The method for manufacturing a bearing apparatus for a wheel of a vehicle according to claim 9 wherein said recutting of the chamfered outer circumferential surface of the back side of the inner ring is re-cut by a grinding stone and at least simultaneously cutting an outer circumferential surface of a larger diameter end of the inner ring.

12. (Withdrawn) The method for manufacturing a bearing apparatus for a wheel of a vehicle according to claim 11 wherein said recutting of the chamfered outer circumferential surface of the back side of the inner ring is re-cut by a grinding stone

and at least simultaneously cutting a back side end face of a front side of the inner ring and an inner raceway surface of the inner ring.

13. (Currently Amended) A bearing apparatus for a wheel of a vehicle comprising:

an inner member including a wheel hub having an integrally formed wheel mounting flange at one end and a cylindrical portion axially extending from the wheel mounting flange[[,]];

fitting an inner ring ~~fitted~~ ~~[[on]]~~ onto the cylindrical portion, the inner ring including an end surface substantially perpendicular to an axis of the bearing apparatus and an outer circumferential surface;

arranging an outer member ~~arranged~~ around the inner member;

containing double row rolling elements freely rollably contained between the inner and outer members;

securing the inner ring ~~being secured~~ in an axial direction relative to the wheel hub; ~~by a~~

outwardly deforming a caulked portion at the end of the cylindrical portion of the wheel hub to abut against the end surface of the inner ring, ~~said caulked portion formed by radially outwardly deforming the end of the cylindrical portion of the wheel hub;~~ and

cutting a chamfered surface ~~on a radially outermost~~ positioned between the end surface and the outer circumferential surface of a back side of the inner ring;

recutting the chamfered surface ~~is formed as a cut surface machined after~~
heat treatment of the inner ring ~~providing~~ such that the chamfered surface ~~to reduce~~
reduces stress concentrations due to gouges on the chamfered surface and ~~to prevent~~
prevents the generation of cracks from the starting point of the gouge during previous
working steps to uniformly distribute the stress concentration that would be caused by a
hoop stress in the inner ring during the caulking operation.